## From the Editor

Ever since the first proposal of electric stimulation to our auditory system to overcome deafness, researchers from many different disciplines have studied and gained much understanding of the effects and limitations of electrical stimulation in both human and animal models. Engineers have also continued to improve the hardware and software of cochlear implant systems. Where these new technology advancements and understanding leading to and what are the next steps?

Before cochlear implants were available, people with deafness had to lead their lives in silence and rarely acquired verbal expressive language resulting from lack of auditory stimulation. Early single-channel cochlear implants provided a glimpse into the colorful world of sounds for people with deafness. Today, highly advanced multichannel cochlear implants are available to the patient and many cochlear implant users can understand open-set speech information without visual cues. The patient selection criteria for cochlear implantation have also been relaxed to less than 50% of speech understanding by acoustic stimulation regardless of pure tone thresholds. Twenty years after Food and Drug Administration's approval of the first single-channel cochlear implant, where are we standing now?

In this issue of *Trends in Amplification*, Dr. Fan-Gang Zeng provides a wealth of information to our readers on the research, development and current status of cochlear implants. He has reviewed the development of cochlear implants from the very first human electric stimulation of the auditory system more than 200 years ago to the latest research on binaural cochlear implants and applications of hearing aid technologies as pre-processors to cochlear implants. Through the discussions of clinical, engineering, and physiological issues, Dr. Zeng has summarized the latest surgical and rehabilitation practices, different coding strategies, and anatomical and physiologic responses to electric stimulation. In addition, he has discussed psychoacoustic performance, speech recognition, music perception and cognitive functions of cochlear implant users under the current state of technology. Dr. Zeng concluded by suggesting and reviewing new areas of research and (re)habilitation options.

Dr. Fan-Gang Zeng is currently a research director at the Department of Otolaryngology-Head and Neck Surgery at University of California, Irvine. He is also an associate professor at Departments of Otolaryngology, Anatomy and Neurobiology, Biomedical Engineering, and Cognitive Science. Dr. Zeng received his BS in Electrical Engineering from University of Science and Technology in China in 1982 and his MS in Biomedical Engineering from Institute of Physiology, Academia Sinica in 1985. Later, he came to the United States to study hearing sciences and received his PhD degree from Syracuse University, New York in 1990. Dr. Zeng joined House Ear Institute as a research associate in 1990 and left as an associate scientist and Director of Auditory Perception Laboratory in 1998. Before joining University of California, Irvine, he was an associate professor at University of Maryland, College Park.

Dr. Zeng has a wide variety of research interests, including auditory perception, speech and music coding in normal and impaired auditory systems, auditory neuropathy and rehabilitation options, computational neuroscience, development of algorithms and systems to enhance speech understanding, design and evaluation of cochlear implants and vestibular implants. Besides being a dedicated researcher, a prolific writer and a perceptive inventor, Dr. Zeng is also a nurturing mentor. He has more than 10 students working and studying with him and one of the mission statements of his lab is to create an intellectually rich environment to nurture next-generation scientists and engineers in hearing and speech research.

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